

Welcome!

Webinar Series hosted by NASA Innovations in
Climate Education, Langley Research Center
Part of NASA's Minority University Research & Education Program
(MUREP)

Project Manager: Monica H. Barnes

Hosts: **Ann Martin** (NASA Langley,
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Agenda

- Introduction/Context Setting
 - Ann Martin & Anne Gold
- Slides contributed by community members
- Discussion

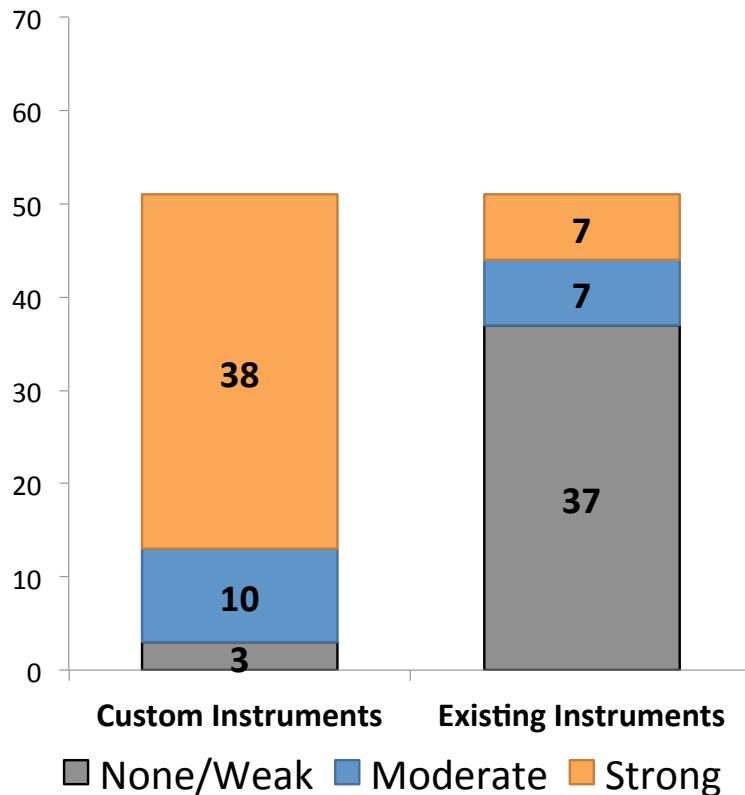
Goal: To share resources and ideas related to the evaluation and assessment of climate education initiatives.

Reminders

- **Please press *6 to mute your phone, to reduce background noise**
- We have several presenters today, so please keep your comments + Q&A to 5 minutes each. We'll have some time for discussion, and encourage offline follow-up.

Context: Evaluation Instruments & Resources

Evaluation Use of Custom/
Existing Instruments



- Standardized assessments or concept inventories have been difficult to find
- Wide diversity in project goals (e.g., what is climate content knowledge?)
- **Innovation has been the solution**
- Evaluation resource library available to evaluators on NICE projects; contact Ann for access

Jenifer Helms

Inverness Research

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The CLEAN Informant Group



OUR EVALUATION QUESTIONS:

- What is the nature of the knowledge, beliefs, and practices of CLEAN's target audience (instructors that teach about the climate and energy)?
- What does CLEAN's target audience think of the resources and support that CLEAN assembles (their quality, value, utility, etc.)?

OUR APPROACH TO ANSWERING THESE QUESTIONS

- Identify and recruit a pool of individuals (~200) across the country who teach climate and energy, grades 6 – 16, some informal, some PD
- Pay them to respond to annual surveys and interview requests that asked about their interest in, concerns about, knowledge of, and needs and practices related to climate and energy, as well as their impressions of the quality and value of the growing CLEAN collection and the navigability of the website.

WHY THIS APPROACH?

- Allows for landscape and evaluative information
- Better, deeper responses than a “cold” survey
- Buy-in and awareness of a key audience of the CLEAN resources
- Can get information over a period of time, adjust questions as project evolves

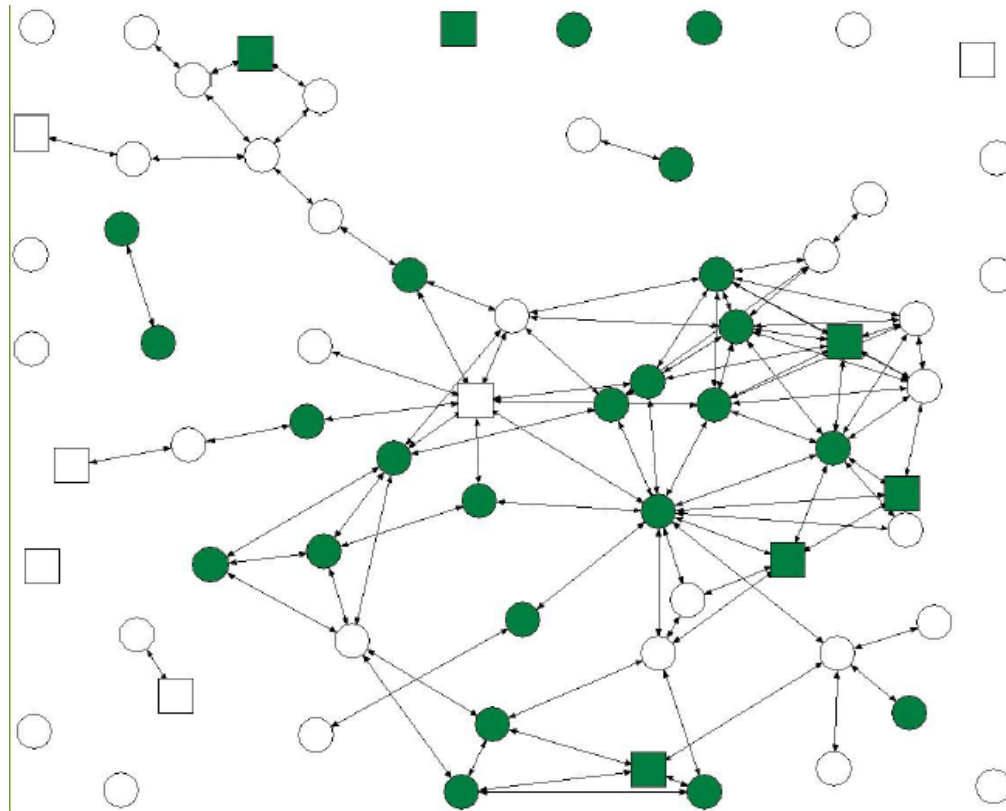
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Network considerations

- Defining networks
 - Small enough to get sufficient response rate (90%)
 - Complete networks & Ego-centric
- Define relationships
 - “Socializing includes spending time with people, having conversations with them outside of work, visiting one another at their homes, going to social events, going out for meals, and so on.”
 - Advice networks
 - Provide names vs. respondents names
- Network measures
 - Mutually agreed upon relationship or any relationship?
 - Describe networks (e.g., homophilly)
 - Describe Individuals (e.g., in and out degree centrality)
 - Describe relationships (e.g., degrees of separation)
- Associations
 - Network or individual outcome measures at same point in time and/or time 2
 - Note networks could change overtime

Picture of church social network



Green = Green leader as identified by at least one person

□ = Self-ID as Environmentalist

No associations between Centrality and time 1 or time 2 measures.

NNOCCI Educators:

- Abandoned ego-centric social, co-worker and peer network ego-centric analyses
 - Still assessing centrality in each training network.
- Still identifying friendship and co-worker network members and sending these Members surveys.

Rachel Becker-Klein

PEER Associates

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National Wildlife Federation

Evaluation Toolkit for Participating Teachers

Evaluation Requirements for Teachers to Administer to Eco-Schools USA CCC to students:

- 1. Pre- and Post-Student Surveys**
- 2. Pre- and Post-Acrostic for “climate change”**
- 3. Reflection Tools for Each Module or Lesson**

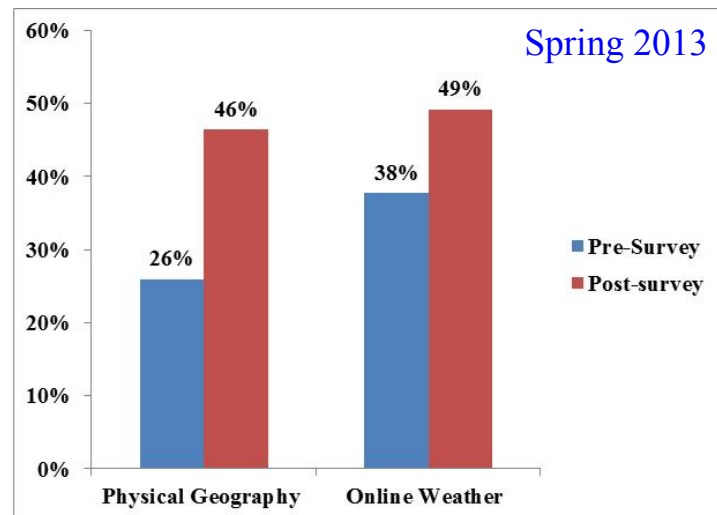
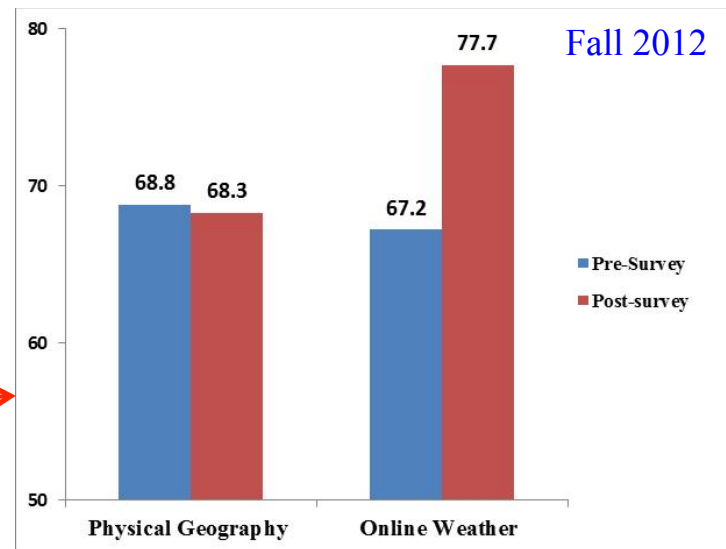
Fei Yan

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NICE Project Evaluation at North Carolina Central University

Climate Change Survey Questionnaire

- A questionnaire was designed for the following courses:
 - GEOG 2100 Physical Geography
 - GEOG 2010 Online Weather
 - EDU 3540 Integrated Science, Mathematics and Technology
- Survey Questions (34 multiple-choice questions in total):
Questions 1-15 for awareness and attitude, Questions 16-34 for knowledge in climate change
- Evaluation Strategies:
 - I: Examine the number of correct answers (3 points per question)
 - II: Examine the percentage of student who are surely aware of climate change



Sample Questions from the Survey Questionnaire

Climate Change Awareness, Attitude, and Knowledge

19. Which of the following is NOT a greenhouse gas? _____
- A. Carbon dioxide
 - B. Methane
 - C. Water vapor
 - D. Nitrous oxide
 - E. None of the above
31. Which of these activities produces the largest carbon footprint? _____
- A. Using 100 kilowatts of electricity generated from coal
 - B. Riding your bicycle to work while breathing very hard
 - C. Burning a small pile of leaves in your yard
 - D. Using one gallon of gasoline while driving

Carole Mandryk

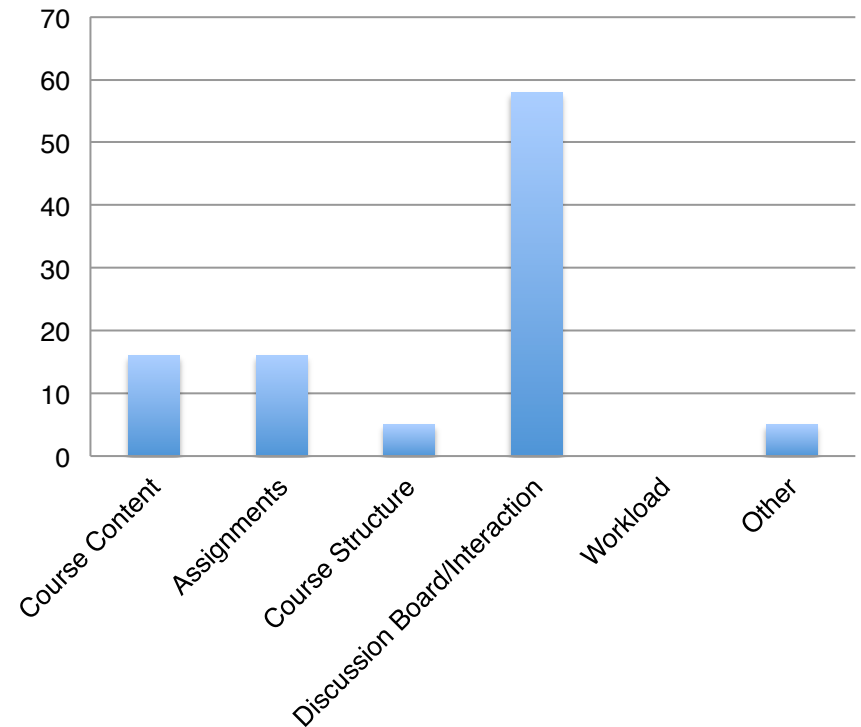
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Never underestimate the value of open-response questions

Yes, tedious to analyze -- but bigger bang for the buck and insight that designers of multiple-choice surveys or online courses might never considered to have asked about.

UNL Human Dimensions of Climate Change student response to: “What is your favorite part of this course?”

Responses were examined for emergent themes and coded into categories. Significant that 58% of open-response comments specifically identified the discussion board and other interactive aspects of the class as their favorite parts of the course.



The students were never asked about the discussion board. Yet it clearly emerged as the most important and valued component of the class. Aside from confirming the importance of engagement and interaction for online learning, this finding highlights where future efforts should focus.

Bottom line: Let the respondents tell **you** what is most important.

Anne Gold

CIRES Education and Outreach Group
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Comparison of Different Assessment Tools with Respect to Students' Mental Models

Anne Gold & Sara Harris

Concept Sketch[#]

“Sketch, label, and describe how the greenhouse effect works. Identify the key features you decide to include. Explain the processes that happen. Indicate how the features and processes are related. Use clear, complete sentences and leaders.”

([#]Johnson and Reynolds, 2005)

Multiple Choice Questions^{*}

- 9 questions - 3 confidence level & 6 w/distractors
- Some questions modified from existing questions, some new.
- Based on 6 learning goals

Short Answers^{*}

- 3 questions

**Qualitative validation w/ student interviews, expert review.*

Comparison of Different Assessment Tools with Respect to Students' Mental Models — Anne Gold & Sara Harris

Incoming SW radiation

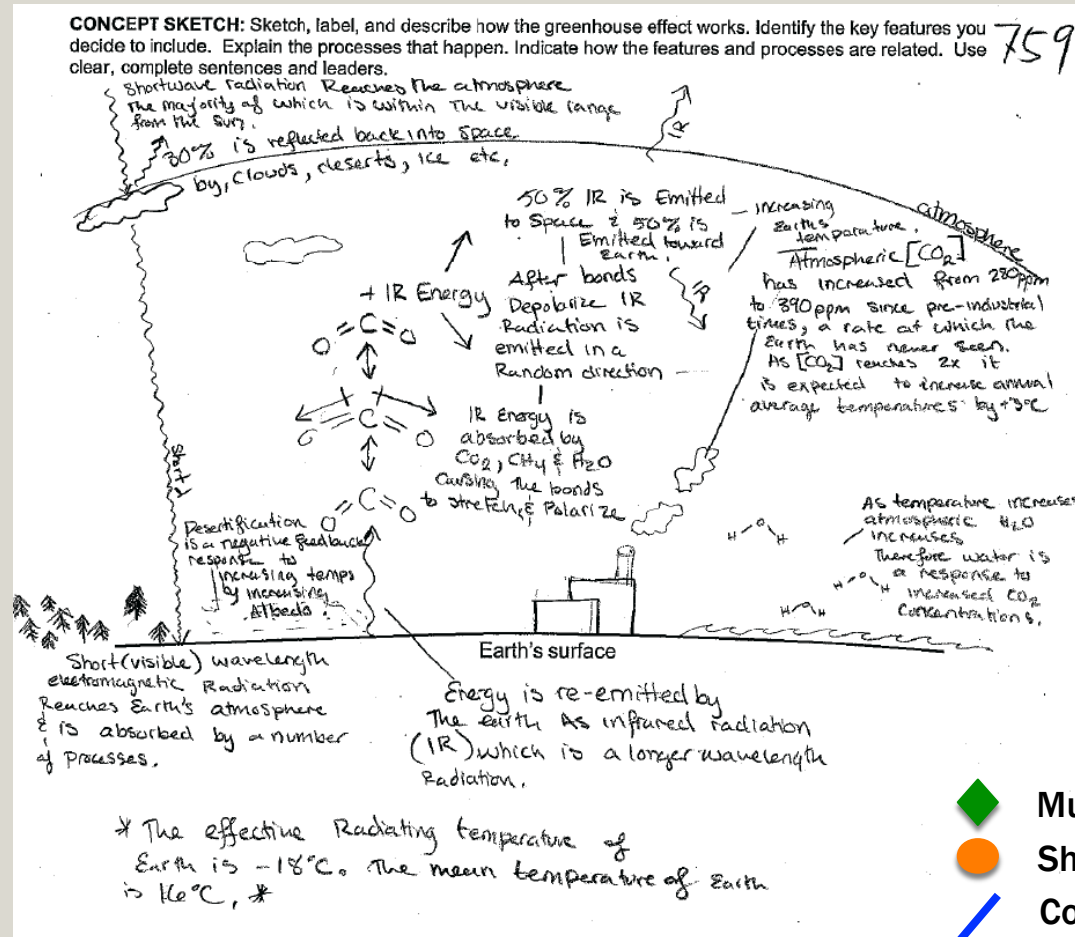
No interaction with GHG

SW radiation absorbed at Earth surface

Earth warms up

Earth emits LW radiation

LW radiation gets absorbed by GHG



Multiple Choice

Short Answer

Concept Sketch

GHG absorb radiation at spec. wavelength

GHG wiggle & vibrate

GHG reemit LW radiation in all directions

LW emitted towards Earth is absorbed

Earth surface, atmosphere warm up

Discussion!

- **Remember: press *6 to un-mute your phone.**